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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

SECOND SUPPLEMENTAL APPEAL BRIEF FOR THE APPELLANTS

Ex parte NAKAJIMA et al.

FIBER REINFORCED PLASTIC PIPE AND POWER TRANSMISSION SHAFT EMPLOYING THE SAME

Serial Number: 10/058,064
Filed: January 29, 2002
Appeal No.:
Group Art Unit: 3754
Examiner: James F. Hook

Submitted herewith is a Supplemental Appeal Brief. In a September 22, 2006, Notice of Non-Compliant Appeal Brief (the "Notice"), it was asserted that the Supplemental Appeal Brief filed August 25, 2005, was deficient for several reasons.

While disagreeing that there exist any deficiencies, Applicants believe that the attached Second Supplemental Appeal Brief overcomes any such asserted deficiencies. Please charge any fee required with respect to this paper, or overpayment to our Deposit Account No. 01-2300, **referencing docket number 100725-00070**

Respectfully submitted,

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Date: October 17, 2006

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of

NAKAJIMA et al.

Art Unit: 3754

Application No.: 10/058,064

Examiner: James F. Hook

Confirmation No.: 3685

Filed: January 29, 2002

Attorney Dkt. No.: 100725-00070

For: FIBER REINFORCED PLASTIC PIPE AND POWER TRANSMISSION SHAFT EMPLOYING THE SAME

SUPPLEMENTAL BRIEF ON APPEAL

Date: October 17, 2006

This is an appeal from the action of the Examiner dated August 11, 2004, finally rejecting claims 1-21, all of the claims pending in this application, as being unpatentable over certain prior art under 35 U.S.C. § 103 and also rejecting claims 1, 3 and 6 as being anticipated by certain prior art under 35 U.S.C. § 102. A Notice of Appeal was timely filed on January 11, 2005 with a Petition for Extension of Time.

I. REAL PARTIES IN INTEREST

The real parties in interest in the present application on appeal are NTN CORPORATION, ASAHI GLASS MATEX CO., LTD., and MITSUBISHI RAYON CO. LTD.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to the appellants, Appellants' representative or assignee that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-21 are rejected. Claims 1-21 are being appealed.

IV. STATUS OF AMENDMENTS

An amendment to claim 4 was made in Applicants' December 13, 2004, Amendment After Final Rejection. The January 3, 2005, Advisory Action indicates that this amendment will be entered. All amendments have been entered according to an Advisory Action mailed January 3, 2005.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The claimed subject matter of independent claim 1 is directed to a fiber reinforced plastic pipe 12a reduced in thickness and increased in diameter by pultrusion process, comprising a fiber bundle spun and aligned in a longitudinal direction, and circumferential reinforced fiber sheet provided at least either on an outer surface layer or on an inner surface layer thereof (see the present specification, page 6, lines 13 to page 7, line 5, in conjunction with Figures 2a to 2c; see also page 15, line 10, to page 17, line 4).

The claimed subject matter of independent claim 2 is directed to a fiber reinforced plastic pipe 12a reduced in thickness and increased in diameter by pultrusion process, comprising a fiber bundle spun and aligned in a longitudinal direction, and circumferential reinforced fiber sheet provided at least either on an outer surface layer or on an inner surface layer thereof, wherein the pipe has a slit 14, capable of being reduced in diameter along the circumference, provided in the longitudinal direction, such that said fiber reinforced plastic pipe can be inserted into a metal pipe (see the present specification, page 7, lines 6 to line 24 in conjunction with reference number "14" in Figures 3a to 3c; see also page 17, line 5 to page 18, line 13).

The claimed subject matter of dependent claim 3 is directed to the above-described fiber reinforced pipe 12a, in which a fiber bundle is formed of fibers spun and aligned in the longitudinal direction, and have a tensile elasticity of 196 GPa or more (see the present specification at page 22, lines 16-19).

The claimed subject matter of dependent claim 4 is directed to the above-described fiber reinforced pipe 12a, in which the tensile elasticity of fibers that form the circumferential reinforced sheet of the fiber reinforced pipe is 58.8 GPa or more, thus, it is easier to prevent the tensile strain from developing in the circumferential direction of the pipe (see the present specification at page 9, line 23 to page 10, line 2).

The claimed subject matter of dependent claim 5 is directed to the above-described fiber reinforced pipe 12a, adapted such that the basis weight, which is weight per unit area or fiber area weight, of the circumferential reinforced fiber sheet of the fiber reinforced pipe is within the range of 100 g/m^2 to 600 g/m^2, which facilitates the continuous formation of the fiber reinforced pipes via, for example, a pultrusion process (see the present specification at page 10, lines 3-9).

The claimed subject matter of dependent claim 6 is directed to the above-described fiber reinforced pipe 12a, wherein the circumferential reinforced fiber sheet of the pipe 12a has a thickness in the range 0.05 mm to 1.0 mm, which facilitates the continuous formation of the pipe 12a via, for example, a pultrusion process (see the present specification at page 10, lines 10-13).

The claimed subject matter of independent claim 7 is directed to a power transmission shaft comprising a metal joint element and a metal pipe 11 jointed to each other, wherein the shaft further comprises a fiber reinforced plastic pipe 12a inserted into said metal pipe, said fiber reinforced plastic pipe being reduced in thickness and increased in diameter by pultrusion process, comprising a fiber bundle spun and aligned in a longitudinal direction, and circumferential reinforced fiber sheet provided at least either on an outer surface layer or on an inner surface layer thereof (see the present specification, page 7, line 25 to page 8, line 15 in conjunction with reference number 12a in the Figures, Figures 4a to 4c).

The claimed subject matter of independent claim 8 is directed to a power transmission shaft comprising a metal joint element and a metal pipe 11 jointed to each other, wherein the shaft further comprises a fiber reinforced plastic pipe 12a inserted into said metal pipe, said fiber reinforced plastic pipe being reduced in thickness and increased in diameter by pultrusion process, comprising a fiber bundle spun and aligned in a longitudinal direction, and circumferential reinforced fiber sheet provided at least either on an outer surface layer or on an inner surface layer, the pipe having a slit 14, capable of being reduced in diameter along the circumference, provided in the longitudinal direction (see the present specification at page 6, line 13 to page 11, line 23, and page 13, line 8, to page 35, line 9 in conjunction with all of the Figures).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1, 3 and 6 were rejected under 35 U.S.C. § 102(b) as being anticipated by Yates et al. (U.S. Patent No. 4,171,626).

Claims 1-21 were rejected under 35 U.S.C. § 103(a) as being obvious Nakajima (U.S. Patent No. 6,409,606) in view of Yates et al.

VII. ARGUMENT

i. The Law

1. The law regarding factual inquiries to determine anticipation.

In order to be anticipatory under 35 U.S.C. § 102, a prior art reference must have each and every feature set forth in the claims, Akzo N.V. v. U.S. Int'l Trade Comm'n, 808 F.2d 1471,1 U.S.P.Q. 2d 1241 (Fed. Cir. 1986).

2. The law regarding factual inquiries to determine obviousness/non-obviousness.

Several basic factual inquiries must be made to determine obviousness or non-obviousness of patent application claims under 35 U.S.C. § 103. These factual inquiries are set forth in Graham v. John Deere Co., 383 U.S. 1,17,148 U.S.P.Q. 459, 467 (1996):

> Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; the level of ordinary skill in the pertinent art resolved. Against this backdrop, the obviousness or non-obviousness of the subject matter is determined.

The specific factual inquiries set forth in *Graham* have not been considered or properly applied by the Examiner formulating the rejections of claims 4 and 5. Particularly the differences between the prior art and the claims were not properly determined. As stated by the Federal Circuit in In re Ochiai, 37 U.S.P.Q. 2d 1127, 1131 (Fed. Cir. 1995):

> [t]he test of obviousness *vel non* is statutory. It requires that one compare the claim's subject matter as a whole with a prior art to which the subject matter pertains. 35 U.S.C. § 103.
>
> The inquiry is highly fact-specific by design.... When the references cited by the Examiner fail to establish a *prima facie* case of obviousness, the rejection is improper and will be overturned. In re Fine, 837 F.2d 1071, 1074, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1988). (Emphasis added.)

When rejecting claims under 35 U.S.C. § 103, an Examiner bears an initial burden of presenting a prima facie case of obviousness. A prima facie case of obviousness is established only if the teachings of the prior art would have suggested the claimed subject matter to a person of ordinary skill in the art. If an Examiner fails to establish a prima facie case, the rejection is improper and will be overturned. See: In re

Rijckaert, 9 F.3d 1531, 28 U.S.P.Q. 2d. 1955 (Fed. Cir. 1993). "If examination.... does not produce a prima facie case of unpatentability, then without more the applicant is entitled to the grant of the patent." In re Oetiker, 977 F.2d 1443, 1445-1446 24 U.S.P.Q. 2d. 1443, 1444 (Fed. Cir. 1992).

Appellant respectfully submits that the Examiner has not made a proper *prima facie* rejection under 35 U.S.C. § 103(a), because the prior art references cited fails to teach or suggest the invention of present claims 1-21.

a) Ground of Rejection- Claims 1, 3 and 6 under 35 U.S.C. § 102(b)

Claims 1, 3 and 6 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Yates et al. (U.S. Patent No. 4,171,626).

The pending claims require, *inter alia*, a "filter reinforced plastic pipe reduced in thickness and increased in diameter by pultrusion process, comprising a fiber bundle spun and aligned in a longitudinal direction and circumferential reinforced fiber sheet..."

Appellants respectfully submit that the cited prior art does not teach or suggest a pipe subjected to both a pultrusion process and containing a fiber bundle that has been spun.

Yates et al. actually teaches that the "various layers can be applied in the appropriate position and configuration by filament winding, tape wrapping, tube rolling, or pultrusion" (col. 6, lines 26-30, *emphasis added*).

As Yates et al. does not teach or suggest both pultrusion and spinning steps, Appellants respectfully submit that the presently claimed invention can not be anticipated by Yates et al.

Additionally, Yates et al. fails to disclose that an fiber reinforced pipe (FRP) is inserted into a metal pipe. In opposition to et al., the present invention discloses that the FRP pipe is inserted into the metal pipe. A power transmission shaft in the present invention has the metal pipe. In addition, et al.discloses that the layer having the fibers disposed at angles. The draft shaft of et al.has a multiple layers structure. In opposition to et al., the power transmission of the present invention does not have the layer having the fibers disposed at angles. In particular, the power transmission of the presently claimed invention does not have the layer having the fibers disposed at angles but requires a circumferential reinforced fiber sheet.

Yates et al. discloses the filament winding method. But a circumferential reinforced fiber sheet cannot be manufactured from the filament winding method. The reason is as follows. The reinforced fiber sheet is intertwined by the discontinuous fiber when the reinforced fiber sheet is an unwoven cloth, the reinforced fiber sheet cannot be manufactured by the filament winding method that uses a consecutive continuous fiber. Moreover, because a general fiber sheet is intertwined mutually by a fiber when the reinforced fiber sheet is not an unwoven cloth, the reinforced fiber sheet cannot be manufactured by the filament winding method of wrapping the fiber bunch that lines up in one direction.

The layer having the fiber disposed at angles of Yates et al. does not correspond to circumferential reinforced fiber sheet of the present invention. Therefore, the presently claimed invention, which requires a circumferential reinforced fiber sheet, is not achieved by Yates et al.

Yates et al discloses a carbon fiber reinforced composite drive shaft. The drive shaft comprises several layers within a resinous matrix material: an innermost layer containing glass fibers, an intermediate layer containing glass fibers, a second intermediate layer containing carbon fibers, and an outermost layer containing glass fibers (column 2, lines 27-42).

Claim 1 recites that the circumferential reinforced fiber sheet is in the outer surface layer. However, Yates et al fails to disclose a fiber reinforced plastic pipe comprising a circumferential reinforced fiber sheet provided on an outer surface layer. Thus, Yates et al. fails to anticipate claims 1, 3 and 6.

b) Ground of Rejection- Claims 1-21 under 35 U.S.C. § 103(a)

i) Claims 1-21

Claims 1-21 were rejected under 35 U.S.C. § 103(a) as being obvious Nakajima (U.S. Patent No. 6,409,606) in view of Yates et al.

The pending claims require, *inter alia*, a "filter reinforced plastic pipe reduced in thickness and increased in diameter by pultrusion process, comprising a fiber bundle spun and aligned in a longitudinal direction and circumferential reinforced fiber sheet..."

Appellants respectfully submit that the cited prior art does not teach or suggest a pipe subjected to both a pultrusion process and containing a fiber bundle that has been spun.

Yates et al. actually teaches that the "various layers can be applied in the appropriate position and configuration by filament winding, tape wrapping, tube rolling, or pultrusion" (col. 6, lines 26-30, *emphasis added*).

As Nakajima et al. does not teach or suggest both pultrusion and spinning steps. Appellants respectfully submit that the presently claimed invention would not have been obvious over the combination of Nakajima et al. and Yates et al.

Additionally, Yates et al. fails to disclose that a fiber reinforced pipe (FRP) is inserted into a metal pipe. In opposition to Yates et al., the present invention discloses that the FRP pipe is inserted into the metal pipe. A power transmission shaft in the present invention has the metal pipe. In addition, Yates et al. discloses that the layer having the fibers disposed at angles. The draft shaft of Yates et al. has a multiple layers structure. In opposition to Yates et al., the power transmission of the present invention does not have the layer having the fibers disposed at angles. In particular, the power transmission of the presently claimed invention does not have the layer having the fibers disposed at angles but requires a circumferential reinforced fiber sheet.

Yates et al. discloses the filament winding method. But a circumferential reinforced fiber sheet cannot be manufactured from the filament winding method. The reason is as follows. The reinforced fiber sheet is intertwined by the discontinuous fiber when the reinforced fiber sheet is an unwoven cloth, the reinforced fiber sheet cannot be manufactured by the filament winding method that uses a consecutive continuous fiber. Moreover, because a general fiber sheet is intertwined mutually by a fiber when the reinforced fiber sheet is not an unwoven cloth, the reinforced fiber sheet cannot be

manufactured by the filament winding method of wrapping the fiber bunch that lines up in one direction.

Nakajima et al. fails to disclose a circumferential reinforced fiber sheet provided at least either on an outer surface layer or on an inner surface layer.

The layer having the fiber disposed at angles of Yates et al. does not correspond to circumferential reinforced fiber sheet of the present invention. Therefore, the presently claimed invention, which requires a circumferential reinforced fiber sheet, is not achieved by the combination of Yates et al. with Nakajima et al..

Nakajima et al. discloses a composite shaft for used as a power transmission shaft. The power transmission shaft of Nakajima et al. comprises metal joint elements welded to a metal pipe, wherein a pipe formed of fiber reinforced plastic (FRP) with high flexural rigidity is inserted into the metal pipe to form a composite shaft (column 2, lines 29-41 and 49-55).

Applicants submit that claims 1 and 2 would not have been obvious over Nakajima et al in view of Yates et al. Nakajima et al. does not teach or suggest a fiber reinforced plastic pipe having a circumferential reinforced fiber sheet on the inner or outer surface layer. The Office Action attempted to use the disclosures of Yates et al. to modify the FRP pipe in the power transmission shaft of Nakajima et al. However, the attempt failed due to two reasons. First, Nakajima et al. requires the FRP pipe to have a high flexural rigidity (column 2, lines 40-41), but Yates et al. does not disclose that the composite drive shaft of Yates et al. has a high flexural rigidity. Second, the composite drive shaft of Yates et al. is designed to be used alone, in replacement of two-piece shafts (column 7, lines 16-17). Since the transmission shaft of Nakajima et al. is a two-

piece shaft, there would have been no motivation for a person of ordinary skill in the art to modify the FRP pipe in the two-piece shaft of Nakajima et al. with the composite drive shaft of Yates et al. Thus, claims 1 and 2 should not have been rejected as obvious over Nakajima et al. in view of Yates et al.

ii) Claims 3-4

In addition to the reasons discussed above in relation to the obviousness rejection of claims 1-21, claims 3 and 4 would not have been obvious over Nakajima et al in view of Yates et al. because Nakajima et al. in view of Yates et al. does not teach or suggest a fiber bundle in the wall of a plastic pipe having a tensile elasticity of 196 GPa or more (in claim 3; see specification at page 22, lines 16-19), or 58.8 GPa or more (in claim 4; see specification at page 9, line 23 to page 10, line 2). The Office Action asserts that the fibers used in the FRP pipe of Nakajima et al. are known to be as strong as those set forth in Yates et al. and would therefore inherently have the same elasticity. Appellants respectfully disagree because there is no evidence that the fibers used in Nakajima et al. "are known to be as strong as those set forth in" Yates et al. Even if, for argument purpose, the fibers used in Nakajima et al. were "known to be as strong as those set forth in" Yates et al., it does not mean that the fibers used in the FRP pipe of Nakajima et al would necessarily have the same elasticity as the fibers used in the drive shaft of Yates et al because fiber strength is not the same as fiber elasticity. This is another reason why claims 3 and 4 should not have been rejected as obvious.

The Office Action also takes a position that the elasticity recited in claims 3 and 4 would have been obvious because a person of ordinary skill in the art could arrive at the

recited elasticity by optimizing, via routine experimentation, the elasticity of the fibers used by Nakajima et al. Appellants respectfully disagree. Nakajima et al is silent on the elasticity of the fibers used in the FRP pipe. Therefore, the person would not have been motivated to optimize the elasticity of the fibers used by Nakajima et al. This is yet another reason why claims 3 and 4 should not have been rejected as obvious.

iii) Claims 5-6

In addition to the reasons discussed above against the obviousness rejection of claim 1-21, claims 5 and 6 would not have been obvious over Nakajima et al. in view of Yates et al. because Nakajima et al. in view of Yates et al. does not teach or suggest the basis weight or thickness of the circumferential reinforced fiber sheet recited in claim 5 or 6 (see the specification at page 10, lines 3-9 for the subject matter of claim 5; see the specification at page 10, lines 10-13 for the subject matter of claim 6). The Office Action takes a position that these recitations were obvious choices of mechanical expedients with optimization of the fibers used by Nakajima et al. via routine experimentation. Applicants respectfully disagree because Nakajima et al. is silent on any circumference reinforced fiber sheet in the FRP pipe, let alone the basis weight or thickness of the circumferential reinforced fiber sheet. Thus, the person of ordinary skill in the art would have no motivation to optimize the basis weight or thickness of the fibers used in the FRP pipe of Nakajima et al. This is another reason why claims 5 and 6 should not have been rejected as obvious.

ii) Claims 7-21

In addition to the reasons discussed above against the obviousness rejection of claim 1-21, claims 7-21 should not have been rejected as obvious over Nakajima et al. in view of Yates et al. because the fiber reinforced plastic pipe recited in claims 7-21 was not taught or suggested by Nakajima et al. in view of Yates et al. There would have been no motivation to replace the FRP pipe, with the composite drive shaft of Yates et al., in the power transmission shaft of Nakajima et al because Yates et al uses the composite drive shaft as a drive shaft *per se*, and not to be inserted into a metal pipe to form a two-piece shaft for used in a power transmission. Thus, claims 7-21 should not have been rejected as obvious over Nakajima et al. in view of Yates et al.

Conclusion

For all of the above noted reasons, it is strongly contended that certain clear differences exist between the applied references and the present invention as claimed in claims 1-21, and that such differences are more than sufficient that the invention of claim 1-21 would not have been obvious to a person having ordinary skill in the art at the time the invention was made.

The final rejections of claims 1, 3 and 6 and of claims 1-21 being in error, therefore, it is respectfully requested that this honorable Board of Patent Appeals and Interferences reverse the Examiner's decisions in this case and indicate the allowability of claims 1-21.

In the event that this paper is not considered timely filed, Appellants respectfully petition for an appropriate extension of time. Any fees for such extension, together with any additional fees which may be due with respect to this paper, may be charged to Deposit Account No. 01-2300, making reference to attorney docket number 100725-00070.

Respectfully submitted,

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APPENDIX 1

CLAIMS ON APPEAL

1. (Previously Presented) A fiber reinforced plastic pipe reduced in thickness and increased in diameter by pultrusion process, comprising

a fiber bundle spun and aligned in a longitudinal direction, and

circumferential reinforced fiber sheet provided at least either on an outer surface layer or on an inner surface layer thereof.

2. (Original) A fiber reinforced plastic pipe reduced in thickness and increased in diameter by pultrusion process, comprising

a fiber bundle spun and aligned in a longitudinal direction, and

circumferential reinforced fiber sheet provided at least either on an outer surface layer or on an inner surface layer thereof, wherein

the pipe has a slit, capable of being reduced in diameter along the circumference, provided in the longitudinal direction, such that said fiber reinforced plastic pipe can be inserted into a metal pipe.

3. (Previously Presented) The fiber reinforced plastic pipe according to claim 1 or 2, wherein

a tensile elasticity of fibers forming said fiber bundle is 196 GPa or more.

4. (Previously Presented) The fiber reinforced plastic pipe according to claim 1 or 2, wherein

a tensile elasticity of fibers forming said circumferential reinforced fiber sheet is 58.8 GPa or more.

5. (Previously Presented) The fiber reinforced plastic pipe according to claim 1 or 2, wherein

a basis weight (FAW) of said circumferential reinforced fiber sheet is in the range of 100 g/m^2 to 600 g/m^2.

6. (Previously Presented) The fiber reinforced plastic pipe according to claim 1 or 2, wherein

a thickness of said circumferential reinforced fiber sheet is in the range of 0.05 mm to 1.0 mm.

7. (Original) A power transmission shaft comprising a metal joint element and a metal pipe jointed to each other, wherein

the shaft further comprises a fiber reinforced plastic pipe inserted into said metal pipe, said fiber reinforced plastic pipe being reduced in thickness and increased in diameter by pultrusion process, comprising a fiber bundle spun and aligned in a longitudinal direction, and circumferential reinforced fiber sheet provided at least either on an outer surface layer or on an inner surface layer thereof.

8. (Original) A power transmission shaft comprising a metal joint element and a metal pipe jointed to each other, wherein

the shaft further comprises a fiber reinforced plastic pipe inserted into said metal pipe, said fiber reinforced plastic pipe being reduced in thickness and increased in diameter by pultrusion process, comprising a fiber bundle spun and aligned in a longitudinal direction, and circumferential reinforced fiber sheet provided at least either on an outer surface layer or on an inner surface layer, the pipe having a slit, capable of being reduced in diameter along the circumference, provided in the longitudinal direction.

9. (Original) The power transmission shaft according to claim 8, wherein the slit has a width of 0.01% or more and 40% or less of the outer circumference thereof in a natural state.

10. (Original) The power transmission shaft according to claim 8 or 9, wherein said slit has a bias angle within ±30 degrees with respect to an axial direction of said fiber reinforced plastic pipe.

11. (Original) The power transmission shaft according to claim 8, wherein a value of D_1/D_2 is greater than 1 and equal to 1.3 or less, where D_1 is an outer diameter of said fiber reinforced plastic pipe and D_2 is an inner diameter of said metal pipe.

12. (Previously Presented) The power transmission shaft according to claim 7 or 8, wherein

a tensile elasticity of fibers forming said fiber bundle is 196 GPa or more.

13. (Previously Presented) The power transmission shaft according to claim 7 or 8, wherein

a tensile elasticity of fibers forming said circumferential reinforced fiber sheet is 58.8 GPa or more.

14. (Previously Presented) The power transmission shaft according to claim 7 or 8, wherein

a basis weight (FAW) of said circumferential reinforced fiber sheet is in the range of 100 g/m^2 to 600 g/m^2.

15. (Previously Presented) The power transmission shaft according to claim 7 or 8, wherein

a thickness of said circumferential reinforced fiber sheet is in the range of 0.05 mm to 1.0 mm.

16. (Original) The power transmission shaft according to claim 7 or 8, wherein said fiber reinforced plastic pipe has a layered structure of 20 layers or less.

17. (Original) The power transmission shaft according to claim 7 or 8, wherein

a value of FL/PL is 0.1 or more and 1.0 or less, where PL is a length of said metal pipe and FL is a length of said fiber reinforced plastic pipe.

18. (Original) The power transmission shaft according to claim 7 or 8, wherein a value of t_2/t_1 is 0.01 or more and 10 or less, where t_1 is a thickness of said metal pipe and t_2 is a thickness of said fiber reinforced plastic pipe.

19. (Original) The power transmission shaft according to claim 7 or 8, wherein said fiber reinforced plastic pipe is fixed to said metal pipe by reducing said metal pipe in diameter along the outer circumference by plastic-working, with said fiber reinforced plastic pipe being inserted in said metal pipe.

20. (Original) The power transmission shaft according to claim 7 or 8, wherein said fiber reinforced plastic pipe is fixed to said metal pipe with an adhesive.

21. (Original) The power transmission shaft according to claim 20, wherein a recessed portion for accommodating adhesive is provided at least on any one of an outer circumference of said fiber reinforced plastic pipe or an inner circumference of said metal pipe.

APPENDIX 2

EVIDENCE

-None-

APPENDIX 3

RELATED PROCEEDINGS

-None-